

# TRANSPORT RESOURCE PACK



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THE PAST

EXPLORE  
THE PRESENT

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THE FUTURE



MOTAT

**MUSEUM OF TRANSPORT AND TECHNOLOGY**

Great North Rd and Meola Rd | Western Springs | Auckland

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Bookings: (09) 815 5808 | Email: [bookings@motat.org.nz](mailto:bookings@motat.org.nz)

# PROGRAMME OVERVIEW

## What is it?

What forms of transport have people used over time? How has transport changed? Why has transport changed? Students will explore changes in transport over time through getting up close to our diverse vehicle collection using group discussion and observation of vehicles from the past.

Discover a range of transport from steam locomotives to Penny Farthings in your self-guided trail around the museum. Students will also get to experience transport from the past through a tram ride. Students can also design a form of transport for the future by adapting a current design.

This resource offers ideas to help teachers and students develop a programme of study which relates to the possible learning experiences on the MOTAT visit.

Once a booking is made, class teachers and museum educators will negotiate the learning goals of each visit to cater for the learning needs of specific class groups.

## Summary

During your visit students will take part in several activities including:

An educator led workshop session which explores the history of transport, both in New Zealand and Auckland. You may also choose to include design developments, past and present comparisons, safety aspects and environmental issues.

Self guided trail around MOTAT using programme related trail cards

Your visit may also include:

- Tram ride
- Tactile Dome
- Voyager 1 ride
- Challenge Zone – Hands On area
- Model Railway

All of these activities are subject to availability and relevance to your learning goals.

Embedded in these learning experiences are the Key Competencies and Values. Successful learners will make use of the competencies and explore their own values and those of others in combination with the pre and post visit learning experiences offered in their own classroom and via the MOTAT experience.



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# CURRICULUM LINKS

## Achievement Objectives and Learning Goals

Achievement aims for Transport have been drawn from the Social Sciences and Technology curriculum areas. Depending on the learning experiences of class groups the following aims may be reached.

Learning goals for each class group will be negotiated with the class teacher before the visit. Suggested are possible learning goals for your group.

Level	Achievement Objective	Students will gain knowledge, skills and experience to:
1	Social Sciences/ Tikanga-a-iwi	<p><b>SOCIAL STUDIES</b> Understand how the past is important to people Understand how places in New Zealand are significant for individuals and groups</p>
	Technology/Hangarau	<p><b>TECHNOLOGICAL KNOWLEDGE</b> <i>Technological systems</i> "Understand that technological systems have inputs, controlled transformations, and outputs"</p> <p><b>NATURE OF TECHNOLOGY</b> <i>Characteristics of technology</i> "Understand that technology is purposeful intervention through design"</p>
	Learning Goals	<ul style="list-style-type: none"> <li>Students are able to give examples of change in moving/transporting people and goods (now and then).</li> <li>Students are able to identify MOTAT as an important place and explain why it is important.</li> <li>Students can name some modifications in vehicles over the last 100 years.</li> </ul>



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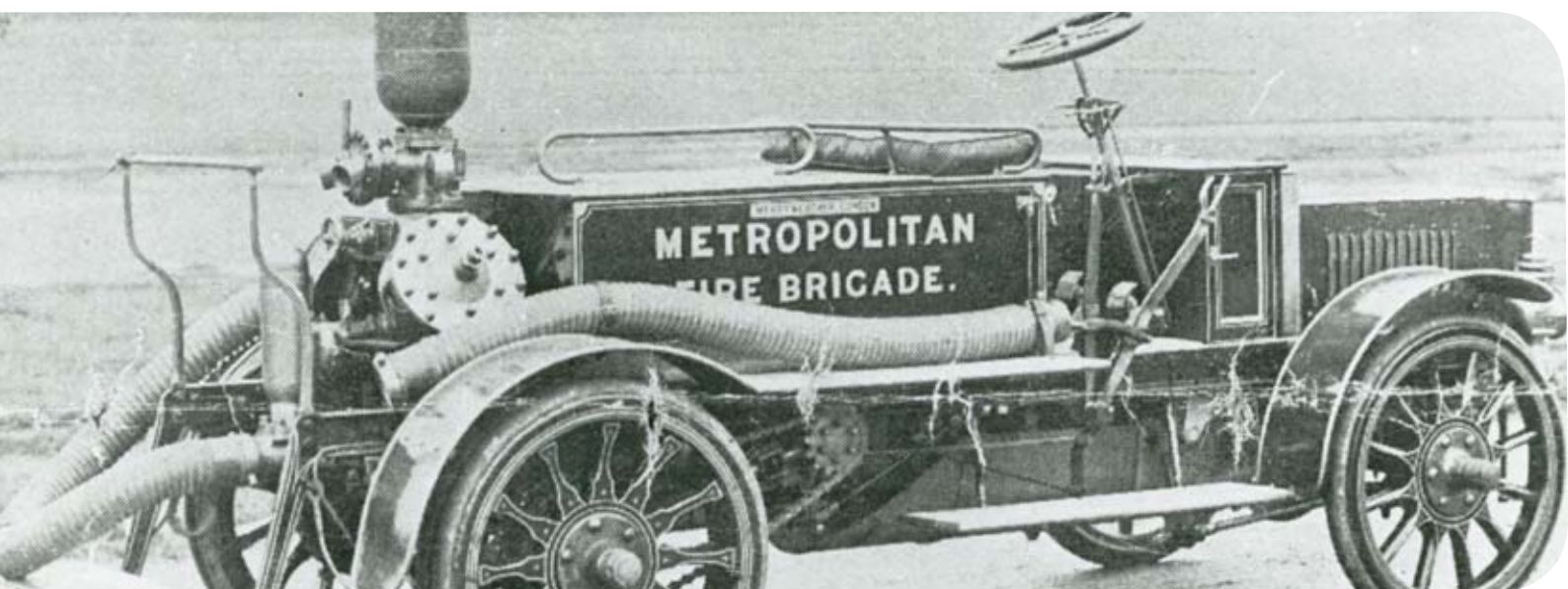
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# CURRICULUM LINKS

Level	Achievement Objective	Students will gain knowledge, skills and experience to:
2	Social Sciences/ Tikanga-a-iwi	<p><b>SOCIAL STUDIES</b> Understand how people make choices to meet their needs and wants</p> <p>Understand how time and change affect people's lives</p>
	Technology/Hangarau	<p><b>TECHNOLOGICAL KNOWLEDGE</b> <i>Technological systems</i> Understand that there are relationships between the inputs, controlled transformations, and outputs occurring within simple technological systems</p> <p><b>NATURE OF TECHNOLOGY</b> <i>Characteristics of technology</i> Understand that technology both reflects and changes society and the environment and increases people's capability</p>
	Learning Goals	<ul style="list-style-type: none"> <li>Students are able to give examples of how developments in transport changed the lives of people.</li> <li>Students are able to identify the effects of different vehicles on the environment (e.g. horse drawn, steam, petrol, electricity)</li> <li>Students are able to identify and describe modifications to vehicle design.</li> </ul>



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# CURRICULUM LINKS

Level	Achievement Objective	Students will gain knowledge, skills and experience to:
3	Social Sciences/ Tikanga-a-iwi	SOCIAL STUDIES Understand how people make decisions about ... (the) use of resources
	Technology/Hangarau	NATURE OF TECHNOLOGY <i>Characteristics of technology</i> Understand how society and environments impact on and are influenced by technology in historical and contemporary contexts and that technological knowledge is validated by successful function
	Learning Goals	<ul style="list-style-type: none"> <li>Students are able to give an example of the relevance and possibilities of this project for the future.</li> <li>Students are able to give reasons (for and against) for designing a new vehicle, in relationship to the environment.</li> </ul>



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# CURRICULUM LINKS

Level	Achievement Objective	Students will gain knowledge, skills and experience to:
4	Social Sciences/ Tikanga-a-iwi	<p><b>SOCIAL STUDIES</b> Understand how producers and consumers exercise their rights and meet their responsibilities</p> <p>Understand how innovation creates opportunities and challenges for people, places and environment</p>
	Technology/Hangarau	<p><b>TECHNOLOGICAL KNOWLEDGE</b> <i>Technological systems</i> Understand how technological systems employ control to allow for the transformation of inputs to outputs</p> <p><b>NATURE OF TECHNOLOGY</b> <i>Characteristics of technology</i> Understand how technological development expands human possibilities and how technology draws on knowledge from a wide range of disciplines</p>
	Learning Goals	<ul style="list-style-type: none"> <li>Students are able to investigate and describe how components are linked in a modern vehicle.</li> <li>Students are able to identify the effects of different vehicles on the environment (e.g. horse drawn, steam, petrol, electricity, solar, bio-fuels)</li> <li>Students are able to identify and describe modifications to vehicle design from the past and predict what changes may occur in the future</li> </ul>



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# KEY COMPETENCIES

## Key Competencies

Students who participate in LEOTC programmes at MOTAT will be developing key competencies.

T	hinking	Through their learning experiences at MOTAT students will be encouraged to question and reflect, both in group and one on one situations. The self guided trail is designed to challenge students to consider and problem solve as they observe the artefacts.
R	elating to others	Through their learning experiences at MOTAT students will be encouraged to communicate and work with others. They will have the opportunity to work together in cooperative group activities.
U	nderstanding language, symbols and texts	Through their learning experiences at MOTAT students will be encouraged to gather information by reading and interpreting object labels and symbols on or beside artefacts or on the trail cards.
M	anaging self	Through their learning experiences at MOTAT students will be encouraged to meet personal goals and manage their learning.
P	articipating and contributing	Through their learning experiences at MOTAT students will be encouraged to develop understandings about the role a museum has within the community. As they develop respect for the museum artefacts and the past they represent, students contribute to the preservation of their community heritage.

## Values

All MOTAT LEOTC programmes integrate values identified by The New Zealand Curriculum (MoE, 2007). Our programmes encourage students to persevere in the face of difficulties; think critically, creatively, and reflectively; respect diversity; be fair, honest, responsible, accountable and act ethically; to respect others, themselves, and the treasures/taonga displayed here at MOTAT.



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# LEARNING EXPERIENCES

## Pre-visit Activities/Discussion Points

Listed below are some ideas for possible learning experiences related to the programme to assist with planning. Select appropriate activities that fit with the learning needs and learning styles of your students. Some Teacher Templates are included for your convenience.

## Design a Vehicle For the Future

### EQUIPMENT:

- Drawing equipment
- Tissue boxes, cardboard tubes, wire, cardboard, polystyrene foam, reels and spools, dowel, lids, straws, (or Lego, K'nex if available)
- Adhesive materials – glue, tape, blu-tac, plasticine, etc.

### TEACHING STRATEGY:

1. Outline the team quest: Can we design a vehicle for the future? Note: The teams that the students work in are intended to be the groups that they will be in during their visit.
2. Once students have created a design plan for their futuristic vehicle, show them the range of materials available.
3. Emphasize the requirement that each team discuss and make a drawing of their vehicle before they build it.  
*There should be no imposed rules or regulations guiding the design. Children should be limited only by the available materials and their imaginations.*
4. Have the students follow each of these steps.
  - Step 1: Brainstorm possible designs for your vehicle of the future.
  - Step 2: Sketch your ideas roughly as a draft.
  - Step 3: Decide on one plan. Choose the design you think is best.
  - Step 4: Draw your plan carefully so that everyone can understand it.
  - Step 5: Collect the materials you will need and, following your plan, build your vehicle.
  - Step 6: Put your vehicle and design plans on display.



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# LEARNING EXPERIENCES

## Design a Vehicle For the Future cont'd

After the students have completed their design but before they visit MOTAT, discuss the following things:  
What will vehicles be like in the future?

*Strict regulations may be in force regarding:*

- Vehicle size (congestion and parking/storage)
- Minimum number of passengers (public vs private transport)
- Materials (recyclable, renewable, environmentally non-toxic)
- Safety features
- Fuel type / consumption
- Emissions

*There may be new technologies available that we can only dream of:*

- Satellite guidance / tracking
- Autopilot / robot chauffeur
- Automatic crash prevention devices
- Tyres that never go flat
- Theft prevention systems
- Self-cleaning
- A chameleon-like colour changing feature

## Design Focus Questions

Keeping these issues in mind, prompt the students to think in more detail about their design. They should formulate a line of enquiry to research during their visit. Encourage them to develop realistic questions that they are likely to find the answers to. They might like to consider:

How many people will the vehicle be able to carry?  
What makes your vehicle safe? Make a list of safety features.  
What will be the main use for your vehicle?  
Does your car create pollution or is it clean?  
Is your vehicle easy to park or store?  
Will your vehicle help or hinder traffic congestion?  
What types of terrain will your vehicle be able to negotiate?  
What makes your vehicle comfortable for passengers?  
Is your vehicle cheap or expensive – why?  
What will power your vehicle? Will it pollute?  
What will your vehicle be made of and why?  
Who (or what) steers the vehicle?  
What kind of latest technology does your vehicle use?  
How does your vehicle stop quickly and safely in an emergency?



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# LEARNING EXPERIENCES

## Post-visit Activities

The following are suggestions to build on the experience at MOTAT

## Vehicle For the Future Design Modification

AIM: To alter students' designs based on the modifications they want to make to their vehicles of the future.

### EQUIPMENT:

- Drawing equipment
- Tissue boxes, cardboard tubes, wire, cardboard, polystyrene foam, reels and spools, dowel, lids, straws, (or Lego, K'nex if available)
- Adhesive materials – glue, tape, blu-tac, plasticine, etc.

### TEACHING STRATEGY:

1. Outline the aim of the activity: To modify the design for our vehicles of the future.
2. Ask the students to carry out the following steps:
  - Step 1: Designate the factor you think is the most important to modify and state why. For example: I chose the area of safety because I think it's important for passengers to be safe when traveling.
  - Step 2: Be as specific as you can with descriptions of your modification.
  - For example: I chose to modify the way my vehicle stops by adding an automatic braking system that is set off when the on-board computer detects an obstacle.
  - Step 3: Redraw your original design to show the modifications you want to make.
  - If your modification is complicated, you might like to draw a plan of that as well.
  - Step 4: Collect the materials you will need and modify your vehicle to match the changes you have made on your design plan.
  - Step 5: Feel free to make further modifications if you have time. Make sure that you are clear about why you are making the change, and don't forget to draw up your plans before modifying your vehicle.
  - Step 6: Display your modified vehicle and modified design plans for the rest of the class to see.
3. Discuss what you have achieved by asking questions like:
  - What was it that you modified about your vehicle?
  - Why did you think that part of your vehicle was important to modify?
  - Do you think your design modification improved your vehicle? In what way?
  - Are you happy with the final design or is there something else you would modify?



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# LEARNING EXPERIENCES

## Post-visit Activity

Continue the time line below by drawing a vehicle for use in the 21st Century.

**Consider:** Purpose of vehicle, materials used, design features, requirements of modern life

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Draw a future car:

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**Please send examples of post visit work back to the educators who worked with you. They are essential for our programme evaluation and development and we love to hear from you again!**

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**Concept mind map** — use these ideas to help get your planning underway. Fill in the gaps on this sheet or start on the blank sheet provided.

## Type and Uses of vehicles

Family Car: transporting small groups of people

Bus: transporting many people

Trucks: transporting freight.

## Petrol

Where from?

How transported?

Sustainability? How?

Disposal?

## How are Roads effected

The more vehicles required means more and wider roads are required

The more vehicles on the road increases chances of accidents

## Power sources

Petrol  
Diesel  
Electricity  
Hydrogen  
Other alternatives

# EFFECTS OF PETROL TRANSPORT IN NEW ZEALAND

## MOTAT VISIT

- Look at electric driven transport
- Exploring how engines work

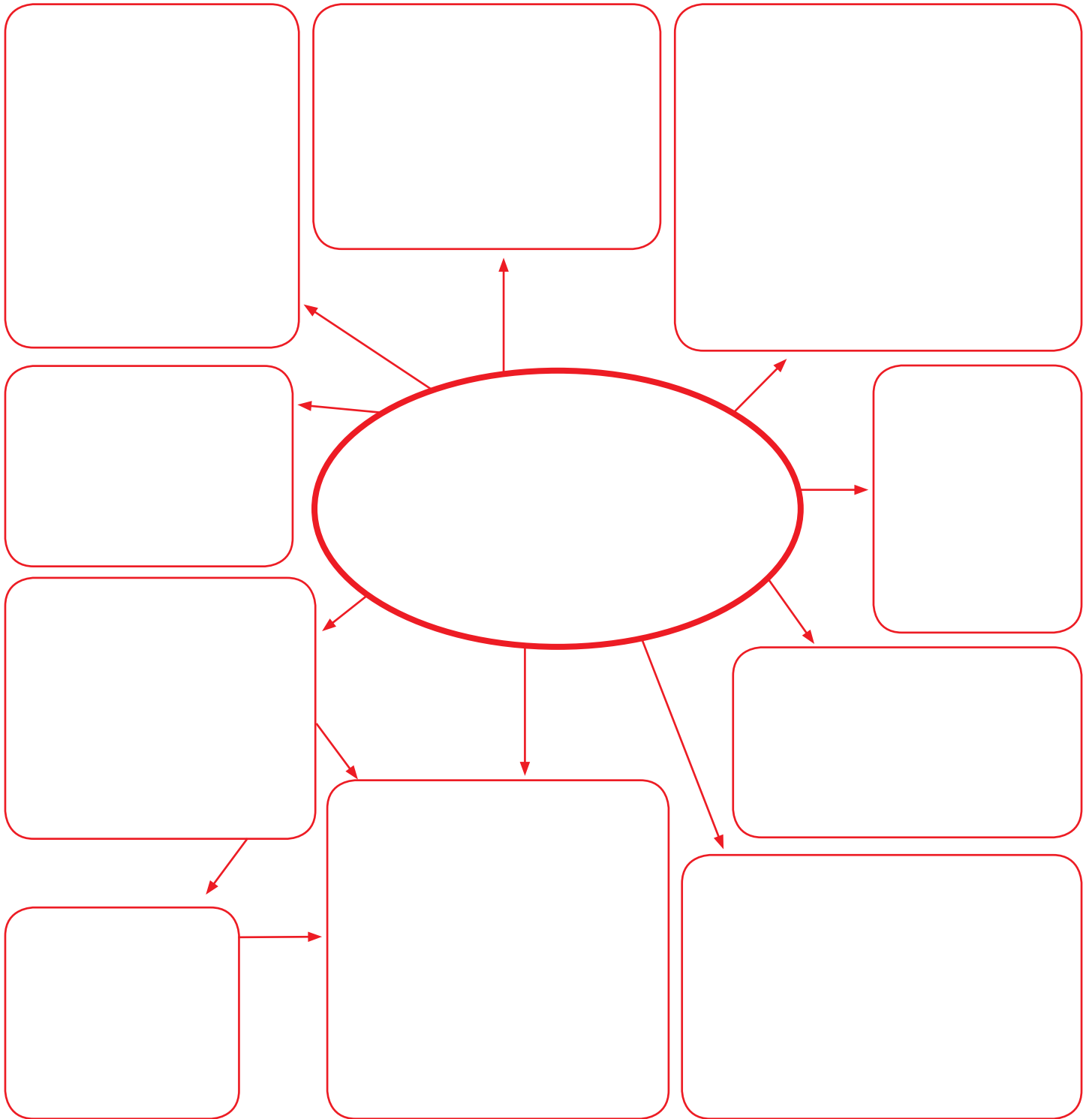
## Environment Impact

Exhaust emissions  
Land use  
Disposal  
Oil mining  
Ocean spills from tankers

## Environmental Impacts

Waste  
Power consumption  
Reuse, recycling  
Power source

## Mind map



# TEACHER TEMPLATES

## Transport

Complete the first two columns before the MOTAT visit.

Use the second two columns after the visit to assess learning and plan future directions.

PLEASE RETURN A SAMPLE OF COMPLETED CHARTS TO MOTAT AFTER YOUR VISIT TO HELP US IMPROVE OUR PROGRAMMING.

What I **KNOW**

What I **WANT**  
to find out about

What I have  
**LEARNED**

What I would like to  
learn **MORE** about

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# TEACHER TEMPLATES

Organise your students' thinking.

You may like to give your students a question/statement to consider:

- What was doing the laundry like before electrical appliances were there to help us?
- What did people do to keep their food fresh before the fridge?
- A coal range changed the lives of Victorian women.
- In the future robots will do all our chores for us?

**PLUS**

**MINUS**

**INTERESTING**

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# SUPPORTING MATERIAL

## Background information on Transport

### Important New Zealand Transport Dates

- 1863  
First steam locomotive service in NZ. The Pilgrim ran on a 7km track at Ferrymead near Christchurch.
- 1898  
First cars in NZ. Imported into Wellington, by William McLean, MP.
- 1902 – 1956  
Electric trams run in Auckland. Eventually replace by electric trolley buses.
- 1903  
Richard Pearse attempts to fly his plane near Timaru, South Island.
- 1905
  - First journey by car from Wellington to Auckland, by two men taking 7 days.
  - Ford builds first model T Fords. 90,000 model T's were sold in New Zealand.
  - North Island Main Trunkline completed. First Wellington – Auckland train services. Before this passengers travelled by steam boat from Onehunga to New Plymouth (beginning in 1886) and then on to Wellington by express train.
- 1908  
7th August. The 'Parliamentary Special' train takes politicians to Auckland. It took over 20 hours. By the 1920's the express took 14 hours. Today it takes 12 hours.
- 1915  
Walsh brothers form NZ flying school at Mission Bay, Auckland.
- 1928  
Charles Kingsford Smith in his airplane 'Southern Cross' makes first trans-Tasman flight.
- 1936  
Jean Batten is the first person to fly solo from England to New Zealand. It took 11 days. The record lasted for 40 years.
- 1947  
First automatic traffic lights in Auckland.
- 1949  
TEAL operates Solent flying boats from the Waitemata Harbour to destinations around the Pacific. Services continue until 1960.
- 1956  
Electric trolley buses replace trams as public transport in Auckland. The last trolley bus in Auckland was withdrawn in 1980.
- 1959  
Auckland Harbour Bridge opened.
- 1965  
TEAL becomes Air New Zealand. Auckland Airport opened.

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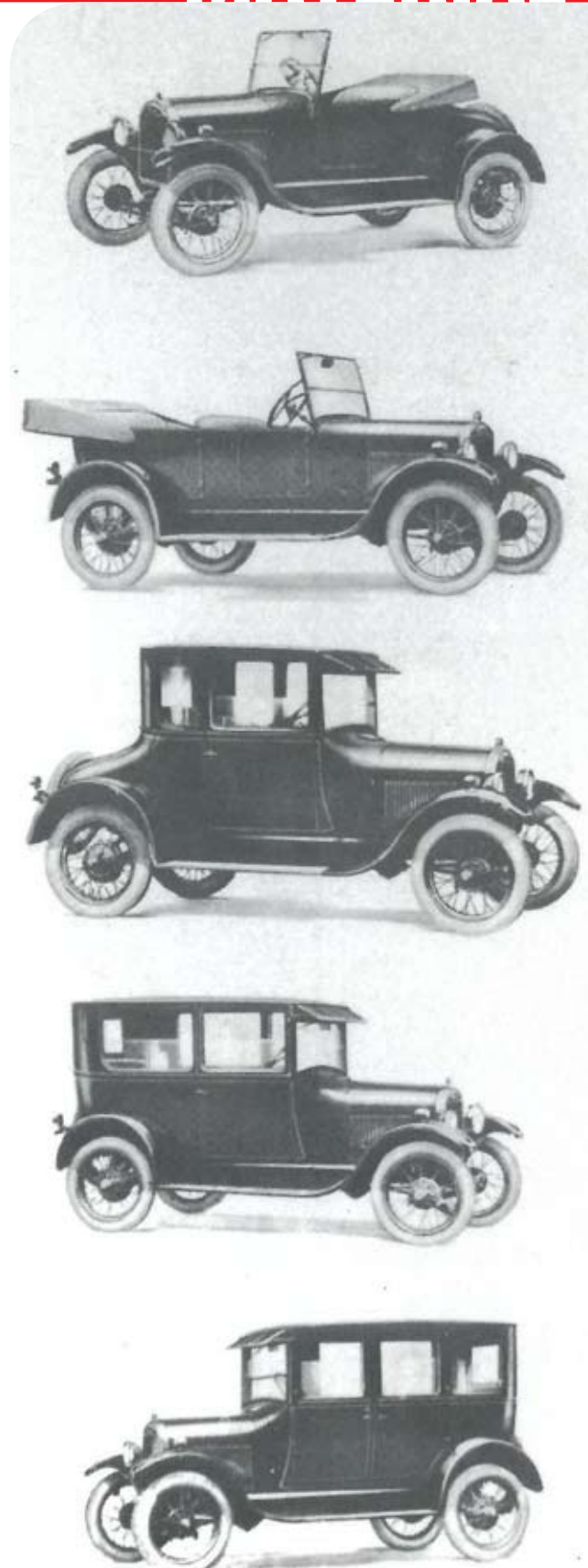
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# SUPPORTING MATERIAL

## Important Transport Innovation Dates

- C6000 BCE – Boat
- C3500 BCE – Wheel
- C3500 BCE – Sail
- C2300 – Horse riding
- 1783 – Hot air balloon
- 1787 – Steam ship
- 1804 – Railway locomotive
- 1825 – Public steam railway
- 1852 – Airship
- 1863 – Underground railway
- 1870 – Penny Farthing bicycle
- 1873 – Cable car
- 1878 – Electric train
- 1882 – Trolley bus
- 1883 – Electric tram
- 1884 – Motorcycle
- 1885 – Petrol engine
- 1885 – Car
- 1903 – Aeroplane
- 1908 – Model T Fords. 90,000 Model T's were sold in New Zealand.
- 1930 – Jet engine
- 1936 – Helicopter
- 1946 – Motor scooter
- 1955 – Hover craft
- 1959 – Seat belt
- 1961 – Space flight



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# SUPPORTING IMAGES

## MOTAT vehicles

MOTAT has many different vehicles; horse drawn carts and buggies, trams, trains, trolley buses, petrol and diesel buses, trucks, fire engines, traction engines, tractors, cars from the vintage era right through until the 1990's, a steam powered car, a solar powered car, bicycles and a Segway scooter. MOTAT also has a large aviation collection at the MOTAT hangar.

**Not all of the vehicles in the collection are able to be on display at once.** Information can be obtained about all of the vehicles either through the Education team or the MOTAT library.

Horse drawn wagon - 1880s



Baldwin Steam Tram 100 - 1890s



Steam locomotive and carriage - 1900s



Dennis Fire Engine - 1930s



McClaren Traction Engine - 1910s



Ford Model T - 1920s



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# SUPPORTING IMAGES

Melbourne Trams- 1940s



Edmund Hillary's Tractor-1950's



Bruce McLaren's Cooper Climax - 1960s



Helen Clark's Scooter - 1970s



The Solar Kiwi - 1980s



## Web Links and Other Resources

These websites are sources of more information. MOTAT does not endorse these sites but includes them as possible research starting points. Teachers should check websites themselves before referring them to their students.

- MOTAT [www.motat.org.nz](http://www.motat.org.nz)
- Land Transport New Zealand [www.landtransport.govt.nz](http://www.landtransport.govt.nz)
- Transit New Zealand [www.transit.govt.nz](http://www.transit.govt.nz)
- Ministry of Transport [www.transport.govt.nz](http://www.transport.govt.nz)
- Trains [www.tranzscenic.co.nz](http://www.tranzscenic.co.nz)
- New Zealand Automobile Association [www.aa.co.nz](http://www.aa.co.nz)
- Auckland Regional Council [www.arc.govt.nz](http://www.arc.govt.nz)
- Encyclopedia of New Zealand [www.teara.govt.nz](http://www.teara.govt.nz)
- New Zealand History Online [www.nzhistory.net.nz](http://www.nzhistory.net.nz)
- How Stuff Works [www.howstuffworks.com](http://www.howstuffworks.com)
- Wikipedia [http://en.wikipedia.org/wiki/Main\\_Page](http://en.wikipedia.org/wiki/Main_Page)





Interactive learning experiences that inspire students to

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